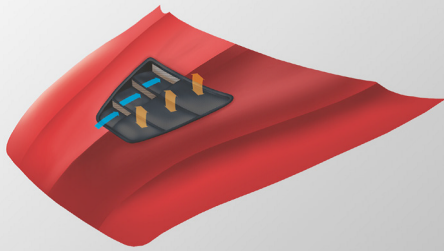




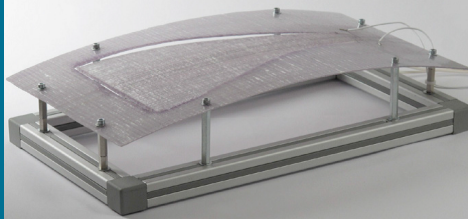
Fraunhofer

ADAPTRONIK

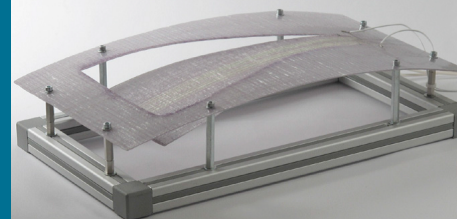
FRAUNHOFER ADAPTRONICS ALLIANCE



1 Example of use: automatically opening air duct



2 Demonstrator (passive / closed)



3 Demonstrator (active / opened)

LIGHTWEIGHT STRUCTURES WITH VARIABLE GEOMETRY AND STIFFNESS

Fraunhofer Institute for Machine Tools and Forming Technology IWU

Reichenhainer Strasse 88
09126 Chemnitz, Germany

Department Adaptronics

Nöthnitzer Strasse 44
01187 Dresden, Germany

M. Eng. Björn Senf
Phone +49 351 4772-2310
bjoern.senf@iwu.fraunhofer.de

www.iwu.fraunhofer.de

Innovation

Conventional construction solutions that enable deformations or changes in stiffness of a structure consist of a variety of components and have disadvantages concerning their heavy weight. Through functionally integrated lightweight construction it is conceivable to reduce system complexity and mass.

By integrating shape-memory actuators into fiber-reinforced polymers, it is possible to realize lightweight structures with variable geometry and stiffness.

Saving resources and emissions is possible due to

- reduction of mass due to the high specific energy density of shape-memory actuators
- reduction of system complexity by applying components with integrated functions

- integration of shape-memory actuators into polymer components using injection molding, hot pressing, extrusion, pultrusion, vacuum infusion.

Example of use

- Automatic air inlets in automobiles
- Shapeshifting blade geometry
- Adaptation of the resonance frequencies in oscillating systems
- Stiffness adaptation of lightweight spring elements

Our range of services

- Development and construction of lightweight structures with independent or controlled changes in geometry or stiffness
- Simulation-based design of individual adaptive lightweight solutions

IN COOPERATION WITH



TECHNISCHE UNIVERSITÄT
CHEMNITZ

